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Calculation of distribution of potential near the surface of metal particle in the dust-electron thermal plasma

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Abstract

© Published under licence by IOP Publishing Ltd. We obtained the equation, which describes the distribution of the potential in an equilibrium dust-electron plasma taking into account parameters of the electron gas inside the dust particles. The inclusion of these parameters performed on the basis of the model of "solid- state plasma," considering the condensed particle system as the ion core and the free electron gas. The analytical expressions for the potential distributions in thermal equilibrium dust- electron plasma were obtained, using a number of simplifying assumptions. It is found that near the particle surface there is a large gradient of the electric potential and as a result the concentration offree electrons, i.e. electrons in the dust particle are located in a potential well. It is shown that the form of the potential barrier at the particle surface depends on the plasma temperature, particle size and concentration.

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